

B. Prod. E. Exam, 2019 (OLD)

(3-rd Yr., 1-st Sem.)

Technology of Machining Systems

Time:3 Hrs.

Full Marks -100

Use separate Answer-scripts for each part.

Part – I (50 marks)

Answer any 5 Q.s

1. A 30 cm. long bar with 3 cm. dia. is to be turned on a lathe. The maxm. allowable feed is 0.025 cm./rev. The cost of labour & overheads/min. is Rs. 13.25/- & each re-grinding of the tool involves an expense of Rs. 106/-. The time reqd. for every tool change is 1 min. 2 alternative mats. A & B can be used. Their cost & tool-life eqn. (for a feed of 0.025 cm./rev.) are as given below:

Matl.	Matl. Cost/piece (Rs.)	Tool life eqn.
A	132.5	$v.T^{0.1} = 30$
B	159	$v.T^{0.16} = 76$

Determine which matl. shd. be used from the cost pt. of view. The setting & idle time involved in each piece is 1 min. Justify your answer. 10

2. a) Sketch schematically:

Internal Cylindrical Grinding, Vertical Surface Grinding. 2+2

b) Name the 2 principal methods of coating with the approx. temp. at which these processes are carried out. 3

c) Write shortly on HSS as a cutting tool material. 3

3. a) Write the expression of optimum cutting speed (for minm. cost), for a given value of feed, in a turning operation, explaining each term of the eqn. 2+5

b) Write the expression of optimum feed (for minm. cost), for a given value of cutting speed, explaining each term. 3

4. a) What are the desirable properties of any cutting tool material? 5

[Turn over

- b) What are the imp. Technological parameters that affect MRR & surface roughness (R) of Lapping process? 5
5. a) How much is the solubility of the typical constituents of coatings (of hard metals) in iron? 1
- b) Sketch schematically:
External Cylindrical Grinding, Centreless Grinding. 2+2
- c) Describe the Honing process. 5
6. a) Write shortly on diamonds & carbides as cutting tool matls. 2+5
- b) What are the principal reasons for grinding a work piece? 3
7. a) What are the different bonding matls. used in grinding wheels? Explain each. 3
- b) Explain the self-sharpening property of grinding wheels. 2
- c) What are the imp. parameters that affect the honing process? 5
8. a) Describe the Lapping process. 5
- b) What are the desirable properties the lap shd. Have for Lapping of materials? 5

B.E. PRODUCTION ENGINEERING THIRD YEAR FIRST SEMESTER EXAM 2019 (OLD)**SUBJECT : TECHNOLOGY OF MACHINING SYSTEMS**

Time : Three hours

Full Marks 100

Use a separate Answer-Script for each part
(50 marks for each part)

No. of questions	PART- II	Marks
Answer any five questions		
1.	Show all the forces acting on chip with the help of a neat sketch (F.B.D) of a chip segment being in equilibrium under the action of several forces).	10
2.	During cylindrical turning of a job with a 0-4-4-3-6-75-1 mm ORS shaped tool , the following observations have been made using a tool force dynamometer: cutting force (P_z) = 140 kgf radial component of thrust force (P_y) = 45 kgf feed, (f) = 0.05 mm/rev. depth of cut (t) = 0.05 mm chip thickness (a_2) = 0.1 mm Calculate (i) the friction force (F), at the chip-tool interface (ii) the shear force (P_s), at the shear plane (Deduce all expressions/relations to solve the problem)	10
3.	Show orientation of face and flank surfaces of a single point cutting tool in ORS system and Machine Reference system (ASA).	10
4.	Establish a relation between the orthogonal rake angle (γ_0), the shear angle (β), and the chip reduction co-efficient (ξ), of a single point cutting tool in metal cutting operation. Write the assumptions made, if any, for developing the relation	10
5.	Discuss why proper choice of cutting speed and feed is must for optimum cutting conditions. Also discuss about the proper choice of depth of cut. Using suitable figures, show the effect of feed on surface finish of a job machined in a i) Lathe, ii) Shaper	10
6.	Show tool wear on face and flank surfaces with neat sketches. Show the growth of flank wear with respect to time of machining for various cutting speeds. Explain how tool life can be estimated from the tool wear information. Also describe how Taylor's Tool Life equation is derived from the flank wear growth information.	3+3+2+2
7.	Write short notes on: i) Chip reduction co-efficient ii) Tool force dynamometer	5+5